



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,279	11/24/2003	Richard A. Hopkins	21486-027DIV	6395

7590 10/15/2004

MINTZ, LEVIN, COHN, FERRIS,  
GLOVSKY and POPEO, P.C.  
One Financial Center  
Boston, MA 02111

EXAMINER

BLANCO, JAVIER G

ART UNIT PAPER NUMBER

3738

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/722,279

Applicant(s)

HOPKINS ET AL.

Examiner

Javier G. Blanco

Art Unit

3738

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicants' cancellation of claims 1-20 in the reply filed on July 21, 2004 is acknowledged.
2. Applicants' addition of claims 23-47 in the reply filed on July 21, 2004 is acknowledged.

### ***Election/Restrictions***

3. Applicants' election without traverse of Group IV: Claims 21-22 (Method of manufacturing an artificial heart valve) in the reply filed on July 21, 2004 is acknowledged.

### ***Drawings***

4. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### ***Specification***

5. The disclosure is objected to because of the following informalities: please update the RELATED APPLICATIONS section ("division of 09/828,768, filed April 9, 2001, now US 6,652,583"). Appropriate correction is required.

### ***Claim Objections***

6. Claims 23, 24, 46, and 47 are objected to because of the following informalities:
  - a. Regarding claim 23, please add --acellular-- in front of "matrix" (see line 1).

Art Unit: 3738

- b. Regarding claim 24, please add --isolated-- in front of “cell type” (see line 1).
- c. Regarding claim 46, please add --genetically-- in front of “modified” (see line 1). Also, please substitute “myofibroblast produces” (see line 1) with -- myofibroblasts produce--.
- d. Regarding claim 47, please add --genetically-- in front of “modified” (see line 1). Also, please substitute “myofibroblast expresses” (see line 1) with -- myofibroblasts express--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 21-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Regarding claim 21, it is confusing how “providing an acellular matrix, seeding said matrix with isolated myofibroblasts, and culturing said myofibroblasts under pulsatile flow conditions” will result in a bioprosthetic heart valve. A “matrix” on its own does not have the shape of a heart valve. How something called a “matrix” will end up having the structure of a heart valve? Claims 22-47 depend on claim 21.

- b. Regarding claim 22, “said centrifugal heart valve” (see line 2) lacks antecedent basis.
- c. Regarding claim 28, “the factors” (see line 1) lacks antecedent basis.
- d. Regarding claim 39, “the intended recipient” (see line 2) lacks antecedent basis.
- e. Regarding claim 40, “the intended recipient” (see lines 1-2) lacks antecedent basis.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 21, 22, 26, 28-36, 39, and 41-44 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Goldstein et al. (US 5,899,937 A).

Goldstein et al. disclose a method of manufacturing a bioprosthetic heart valve comprising (i) providing an acellular or decellularized porcine valve (see column 1, lines 58-62; column 5, lines 24-26), (ii) seeding said acellular or decellularized porcine valve with isolated fibroblasts (i.e., dermal myofibroblasts; see column 1, line 61 to column 2, line 4; column 3, lines 11-13; column 6, lines 44-63; column 13, lines 7-11 and lines 15-24) wherein the myofibroblasts produce at least two-fold more type I collagen compared to type III collagen (see Abstract; column 1, lines 58-67; column 2, lines 1-67; column 6, lines 44-62; column 13, lines 7-11 and lines 20-24; column 14, line 65; see entire document), and (iii) culturing said myofibroblasts under pulsatile flow conditions (see Abstract; see column 2, lines 50-53; column 3, lines 10-13; column 7, lines 53-67; column 9, lines 21-25; column 14, lines 27-37).

11. Claims 21-43 and 45-47 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Wolfinbarger, Jr. (US 6,432,712 B1).

Wolfinbarger, Jr. discloses a method of manufacturing a bioprosthetic heart valve comprising (i) providing an acellular matrix (either a tissue engineered acellular graft, or, a

Art Unit: 3738

decellularized native vascular graft from human or animal sources: see Abstract; see Claim 1; see column 2, lines 48-53), (ii) seeding said acellular matrix with isolated fibroblasts (i.e., myofibroblasts; see Claim 1; see column 3, lines 7-10; column 6, lines 55-60; column 7, lines 11-15; column 10, lines 47-49 and lines 60-63; column 13, lines 22-40) wherein the myofibroblasts inherently produce at least two-fold more type I collagen compared to type III collagen, and (iii) culturing said myofibroblasts under pulsatile flow conditions (see column 2, lines 17-31; column 3, lines 27-37; column 13, lines 5-8). The method further comprises seeding said matrix with at least one other isolated cell type (i.e., endothelial cells; see Abstract; see Claim 1; see column 3, lines 17-20; column 6, lines 61-67; column 11, line 52 to column 12, line 5). The cells can be genetically manipulated (see entire document).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. (US 6,432,712 B1).

Wolfinbarger, Jr. discloses the invention as claimed (see 102(e) rejection above) except for particularly disclosing the pulsatile flow conditions disclosed in claim 44 (i.e., flow values: 2-7.5 liters/min; frequency: 60-120 cycles/min; resistance to duplicate back pressure of up to 120 mm Hg). However, it would have been obvious to one having ordinary skill in the art at the time

Art Unit: 3738

the invention was made to have used these particular pulsatile flow conditions (i.e., flow values: 2-7.5 liters/min; frequency: 60-120 cycles/min; resistance to duplicate back pressure of up to 120 mm Hg) since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Vacanti et al. (US 5,855,610 A), and Hoerstrup et al. (DE 102 35 237 A1).

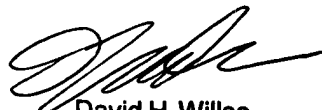
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javier G. Blanco whose telephone number is 703-605-4259. The examiner can normally be reached on M-F (7:30 a.m.-4:00 p.m.), first Friday of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Corrine McDermott can be reached on 703-308-2111. The fax phone numbers for the organization where this application or proceeding is assigned is 703-872-9306 for regular communications and After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.

JGB

October 12, 2004



David H. Willse  
Primary Examiner